



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER OF PATENTS AND TRADEMARKS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/761,486	01/16/2001	Wen-Chih Chiou	67,200-306	6239

7590 06/06/2003

TUNG & ASSOCIATES
Suite 120
838 W. Long Lake Road
Bloomfield Hills, MI 48302

EXAMINER

MARKHAM, WESLEY D

ART UNIT	PAPER NUMBER
----------	--------------

1762

DATE MAILED: 06/06/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/761,486

Applicant(s)

CHIOU ET AL.

Examiner

Wesley D Markham

Art Unit

1762

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 07 April 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,2,5-7 and 9-17 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,2,5-7 and 9-17 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☒ The proposed drawing correction filed on 30 September 2002 is: a) ☒ approved b) ☐ disapproved by the Examiner
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☐ Interview Summary (PTO-413) Paper No(s) _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

DETAILED ACTION

Response to Amendment

1. Acknowledgement is made of applicant's amendment D, filed as paper #11 on 4/7/2003 (with a certificate of mailing dated 4/3/2003), in which Claims 5 – 7 were amended. Claims 1, 2, 5 – 7, and 9 – 17 are currently pending in U.S. Application Serial No. 09/761,486, and an Office Action on the merits follows.

Drawings

2. The proposed drawing correction and/or the proposed substitute sheets of drawings (i.e., 1 sheet containing proposed changes to Figures 4 and 5), filed on 9/30/2002, has been approved. A proper drawing correction or corrected drawings are required in reply to the Office Action to avoid abandonment of the application. The correction to the drawings will not be held in abeyance.
3. The Patent and Trademark Office no longer makes drawing changes. See 1017 O.G. 4. It is applicant's responsibility to ensure that the drawings are corrected. Corrections must be made in accordance with the instructions below.

INFORMATION ON HOW TO EFFECT DRAWING CHANGES

Correction of Informalities -- 37 CFR 1.85

New corrected drawings must be filed with the changes incorporated therein. Identifying indicia, if provided, should include the title of the invention, inventor's name, and application number, or docket number (if any) if an application number has not been assigned to the application. If this information is provided, it must be placed on the front of each sheet and centered within the top margin. If corrected drawings are required in a Notice of Allowability (PTOL-37), the new drawings **MUST** be filed within the **THREE MONTH** shortened statutory period set for reply in the "Notice of Allowability." Extensions of time may **NOT** be

Art Unit: 1762

obtained under the provisions of 37 CFR 1.136 for filing the corrected drawings after the mailing of a Notice of Allowability. The drawings should be filed as a separate paper with a transmittal letter addressed to the Official Draftsperson.

Corrections other than Informalities Noted by Draftsperson on form PTO-948.

All changes to the drawings, other than informalities noted by the Draftsperson, **MUST** be made in the same manner as above except that, normally, a highlighted (preferably red ink) sketch of the changes to be incorporated into the new drawings **MUST** be approved by the examiner before the application will be allowed. No changes will be permitted to be made, other than correction of informalities, unless the examiner has approved the proposed changes.

Timing of Corrections

Applicant is required to submit acceptable corrected drawings within the time period set in the Office action. See 37 CFR 1.185(a). Failure to take corrective action within the set (or extended) period will result in **ABANDONMENT** of the application.

Claim Rejections - 35 USC § 112

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. The rejection of Claims 5 – 7 under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention, set forth in paragraphs 7 – 8 of the previous Office Action (i.e., the non-final Office Action, paper #10, mailed on 1/3/2003), is withdrawn in light of applicant's amendment D, in which the antecedent basis issues in the claims were clarified / corrected.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).
8. Claims 1, 2, 5, 9 – 11, and 13 – 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Plat et al. (USPN 6,265,751 B1) in view of Holscher et al. (6,274,292 B1) as set forth in paragraphs 11 – 13 of the previous Office Action.
9. Claims 6 and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Plat et al. (USPN 6,265,751 B1) in view of Holscher et al. (6,274,292 B1), and in further

Art Unit: 1762

view of Demirlioglu (USPN 6,063,704) as set forth in paragraphs 15 – 16 of the previous Office Action.

10. Claims 1, 2, 6, 9 – 11, and 13 – 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Holscher et al. (USPN 6,274,292 B1) in view of Plat et al. (USPN 6,265,751 B1) as set forth in paragraphs 18 – 19 of the previous Office Action.
11. Claims 5, 7, and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Holscher et al. (USPN 6,274,292 B1) in view of Plat et al. (USPN 6,265,751 B1), and in further view of Sandhu et al. (USPN 6,268,282 B1) as set forth in paragraphs 21 – 22 of the previous Office Action.
12. Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over Holscher et al. (USPN 6,274,292 B1) in view of Plat et al. (USPN 6,265,751 B1), and in further view of either Lee (USPN 6,300,672 B1) or Yao et al. (USPN 6,258,734 B1) as set forth in paragraph 24 of the previous Office Action.

Response to Arguments

13. The applicant's arguments filed on 4/7/2003 have been fully considered but are not persuasive.
14. Regarding the 35 U.S.C 103(a) rejections based on Plat et al. in view of Holscher et al., the applicant argues that the process of Plat et al. involves condensing the ARC

Art Unit: 1762

layer to approximately the desired thickness and that "...condensing the ARC layer does not adversely affect the anti-reflective properties of the ARC layer", and therefore, Plat et al.'s process achieves a completely different result than that achieved by the present invention and is used for a completely different purpose than the method of the present invention.

15. In response, the examiner notes that this argument is drawn to the Plat et al.

reference alone, while the rejections are based on the combination of Plat et al. and Holscher et al. Please note that one cannot show non-obviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986). Additionally, the examiner agrees with the applicant that the process of Plat et al. involves condensing the ARC layer to approximately the desired thickness and that "...condensing the ARC layer does not adversely affect the anti-reflective properties of the ARC layer". However, the applicant's claims are open to (i.e., do not exclude) the situation in which the ARC layer is condensed by the annealing process.

Further, Plat et al.'s teaching that the anti-reflective properties of the ARC layer are not adversely affected by the condensing (i.e., annealing) process does not mean or suggest that the properties are not changed / altered at all – it simply means that the properties are not detrimentally affected. For example and as noted by the applicant, the condensing step of Plat et al. decreases the thickness of the ARC layer, a process that would necessarily affect and alter the anti-reflective properties

of an ARC (i.e., because the anti-reflective properties of an ARC are dependent on the thickness of the ARC itself). In addition, the examiner agrees with the applicant that the stated purpose of the annealing process of Plat et al. (i.e., condensing the ARC) is different from the stated purpose of the applicant's claimed process (i.e., to adjust the optical properties such as the refractive index (n) and/or extinction coefficient (k) of the ARC). However, the examiner disagrees with the applicant's statement that Plat et al.'s process achieves a completely different result than the claimed process. Specifically, the combination of Plat et al. and Holscher et al. teaches all the process steps and limitations of the applicant's claims, including the type of substrate, the nature of the ARC (i.e., SiONH), the annealing temperature, the annealing time, and the type of gas used in the annealing process. Therefore, the method of the combination of Plat et al. and Holscher et al. would have inherently adjusted the optical properties, such as the extinction coefficient, of the ARC layer as claimed by the applicant. Please note that the fact that applicant has recognized another advantage (i.e., that an ARC annealing process such as the one taught by Plat et al. alters the optical properties of the ARC) which would flow naturally from following the suggestion of the prior art cannot be the basis for patentability when the differences would otherwise be obvious. See *Ex parte Obiaya*, 227 USPQ 58, 60 (Bd. Pat. App. & Inter. 1985).

16. Second, the applicant argues that, in the present invention, the specific combination of the dielectric ARC layer / substrate surface is used to maximize the compatibility between the two, and Plat et al. is not concerned with such a compatibility problem.

Art Unit: 1762

In other words, the applicant argues that Plat et al. does not teach the desirability or need to use other than SiON ARC material, while the present invention clearly shows the necessity of utilizing an SiONH or SiO₂ dielectric ARC layer. As support for this argument, the applicant cites page 3, line 8, through page 4, line 1, of the specification.

17. In response, the examiner disagrees with the applicant's assessment, specifically the applicant's statement that the present invention clearly shows the necessity of utilizing an SiONH or SiO₂ dielectric ARC layer. This is not the case. For example, the examiner reviewed page 3, line 8, through page 4, line 1, of the applicant's specification (i.e., the portion of the specification cited by the applicant), and this portion of the specification teaches that, for compatibility reasons, a dielectric type anti-reflective coating material is more suitable for coating the polysilicon or the silicon nitride surface. The applicant's specification does not assert or suggest that there is any criticality or compatibility advantage gained by using an SiONH or SiO₂ dielectric ARC (as presently claimed by the applicant) as opposed to an SiON ARC (as taught by Plat et al.). In fact, the applicant's specification specifically teaches that the dielectric ARC may be SiO₂, SiON, or SiONH (page 3, lines 18 – 20), thereby contradicting the applicant's argument. The examiner also wishes to note that utilizing SiON as the dielectric ARC was originally claimed by the applicant (see, for example, originally filed Claims 2 – 4) but is no longer being claimed due to applicant's amendments. The examiner maintains that Plat et al., which teaches all of the applicant's process steps but uses an SiON ARC as opposed to an SiONH or

SiO₂ ARC, and Holscher et al., which teaches the functional equivalence of an SiON ARC and an SiONH ARC, in combination, reasonably suggest each and every limitation of the applicant's claims.

18. Third, the applicant argues that there is no motivation to combine Plat et al. with Holscher et al. because Plat et al. does not contain any teaching or suggestion that the SiON ARC layer is not compatible with the substrate surface, and Holscher et al. does not contain any teaching or suggestion that the SiONH ARC layer is especially compatible with certain substrate surfaces.
19. In response, the examiner disagrees with the applicant's statement that there is no reason or motivation to combine Plat et al. with Holscher et al. Briefly, Plat et al. teaches that a "conventional ARC layer" is provided on the polysilicon layer (Col.2, lines 47 – 49), and that the conventional ARC layer is typically SiON (Col.4, lines 38 – 39). However, the process of Plat et al. does not appear to be limited to solely a SiON ARC layer. Holscher et al. teaches the functional equivalence of a SiON dielectric ARC layer (i.e., as taught by Plat et al.) and a SiONH dielectric ARC layer (i.e., as claimed by the applicant) in the art of reducing reflections during the patterning of photoresist layers in semiconductor device applications (Col.2, lines 56 – 65). Therefore, it would have been obvious to one of ordinary skill in the art to substitute a SiONH dielectric ARC layer (i.e., as taught by Holscher et al.) for the SiON dielectric ARC layer in the process of Plat et al. with the reasonable expectation of (1) success, as SiON and SiONH dielectric ARC layers are chemically similar, and (2) obtaining similar results, specifically depositing a

Art Unit: 1762

conventional ARC layer to a desired thickness on a polysilicon layer and then annealing the ARC layer to densify it, as desired by Plat et al. A substitution of art-recognized equivalents, such as substituting SiONH for SiON as an ARC, is a sufficient motivation to combine references and to support an obviousness rejection (See, for example, MPEP 2144.06). An express suggestion to substitute one equivalent component for another is not necessary to render such substitution obvious (*In re Fout*, 675 F.2d 297, 213 USPQ 532 (CCPA 1982)).

20. Fourth, the applicant argues that the combined teachings of Holscher et al. and Plat et al. do not teach the invention contained in independent Claims 1 and 13, since neither reference recognizes the problem of compatibility, and therefore, neither reference provides such a solution, as provided by the present invention.
21. In response to this argument, the fact that applicant has recognized another advantage (i.e., that dielectric ARCs are especially compatible with and suitable for coating polysilicon and silicon nitride surfaces) which would flow naturally from following the suggestion of the prior art cannot be the basis for patentability when the differences would otherwise be obvious. See *Ex parte Obiaya*, 227 USPQ 58, 60 (Bd. Pat. App. & Inter. 1985). In other words, it appears to the examiner that the reason that Plat et al. and Holscher et al. do not discuss ARC "compatibility problems" at length is that the specific ARCs taught by Plat et al. and Holscher et al. (e.g., SiONH, SiON, etc.) are dielectric ARCs and do not have compatibility problems, an advantage of dielectric ARCs recognized by the applicant.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Wesley D Markham whose telephone number is (703) 308-7557. The examiner can normally be reached on Monday - Friday, 8:00 AM to 4:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Shrive Beck can be reached on (703) 308-2333. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9310 for regular communications and (703) 872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.

Application/Control Number: 09/761,486

Page 12

Art Unit: 1762

Wesley D Markham

Examiner

Art Unit 1762



WDM

June 4, 2003



SHRIVE P. BECK
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 1700